

## SECTION 13

### HAND AND POWER TOOLS

#### 13.A GENERAL

13.A.01 Power tools shall be of a manufacture listed by a nationally recognized testing laboratory for the specific application for which they are to be used.

13.A.02 Use, inspection, and maintenance.

a. Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations and shall be used only for the purpose for which designed. A copy of the manufacturer's instructions and recommendations shall be maintained with the tools.

b. Hand and power tools shall be inspected, tested, and determined to be in safe operating condition before use: continued periodic inspections shall be made to assure safe operating condition and proper maintenance.

c. Hand and power tools shall be in good repair and with all required safety devices installed and properly adjusted: tools having defects that will impair their strength or render them unsafe shall be removed from service.

13.A.03 Guarding.

a. Power tools designed to accommodate guards shall be equipped with such guards.

b. Reciprocating, rotating, and moving parts of equipment shall be guarded if exposed to contact by employees or otherwise create a hazard.

13.A.04 When work is being performed overhead, tools not in use

shall be secured or placed in holders.

13.A.05 Throwing tools or materials from one location to another or from one person to another, or dropping them to lower levels, shall not be permitted.

13.A.06 Only nonsparking tools shall be used in locations where sources of ignition may cause a fire or explosion.

13.A.07 Tools requiring heat treating or redressing shall be tempered, formed, dressed, and sharpened by personnel who are experienced in these operations.

13.A.08 The use of cranks on hand-powered winches or hoists is prohibited unless the hoists or winches are provided with positive self-locking dogs: hand wheels with projecting spokes, pins, or knobs shall not be used.

13.A.09 Hydraulic fluid used in powered tools shall retain its operating characteristics at the most extreme temperatures to which it will be exposed. **> For underground use, see 26.D.07**

13.A.10 Manufacturers' safe operating pressures for hydraulic hoses, valves, pipes, filters and other fittings shall not be exceeded.

13.A.11 All hydraulic or pneumatic tools which are used on or around energized lines or equipment shall have nonconducting hoses of adequate strength for the normal operating pressures.

13.A.12 When fuel-powered tools are used in enclosed spaces, the requirements for concentrations of toxic gases and use of personal protective equipment, as outlined in sections 5 and 6 of this manual, shall apply.

13.A.13 Clothing.

- a. PPE shall be used as outlined in Section 6 of this manual.

- b. Loose and frayed clothing, loose long hair, dangling jewelry (including dangling rings, chains, and wrist watches) shall not be worn while working with any power tool.

13.A.14 See Section 11.C for grounding requirements.

### 13.B GRINDING AND ABRASIVE MACHINERY

13.B.01 With the exception of the following, abrasive wheels shall be used only on machines provided with safety guards: **> see ANSI B74.2 for descriptions of abrasive wheel types**

- a. wheels used for internal work while within the work being ground;
- b. mounted wheels, 5 cm (2 in) and smaller in diameter, used in portable operations;
- c. types 16, 17, 18, 18R, and 19 cones and plugs and threaded hole pot balls where the work offers protection or where the size does not exceed 7.5 cm (3 in) in diameter by 12.5 cm (5 in) long;
- d. type 1 wheels not larger than 5 cm (2 in) in diameter and not more than 1.25 cm (0.5 in) thick, operated at peripheral speeds less than 9 surface-m/s (1800 surface-ft/min) when mounted in mandrels driven by portable drills;
- e. type 1 reinforced wheels not more than 7.5 cm (3 in) in diameter and 0.6 cm (0.25 in) in thickness, operating at peripheral speeds not exceeding 48 surface-m/s (9500 surface-ft/min), if safety glasses and face shield protection are worn.

13.B.02 Tongue guards on hand held power grinders shall be adjustable to within 0.6 cm (1/4 in) of the constantly decreasing diameter of the wheel at the upper opening.

13.B.03 Grinding machines shall be supplied with power sufficient to maintain the spindle speed at safe levels under all conditions of normal operation.

13.B.04 Work or tool rests shall not be adjusted while the grinding wheel is in motion.

13.B.05 Tool rests on power grinders shall not be more than 0.3 cm (1/8 in) distance from the wheel.

13.B.06 All abrasive wheels shall be closely inspected and ring-tested before mounting: cracked or damaged grinding wheels shall be destroyed.

13.B.07 Grinding wheels shall not be operated in excess of their rated safe speed.

13.B.08 Floor stand and bench-mounted abrasive wheels used for external grinding shall be provided with safety guards (protective hoods).

- a. The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90°, except that when work requires contact with the wheel below the horizontal plane of the spindle the angular exposure shall not exceed 125°; in either case, the exposure shall begin not more than 65° above the horizontal plane of the spindle.
- b. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

### **13.C POWER SAWS AND WOODWORKING MACHINERY**

13.C.01 Guarding.

- a. Circular saws shall be equipped with guards that automatically and completely enclose the cutting edges, splitters, and antikickback devices.
- b. All portable power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper and lower guards shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts and for the minimum arc required to allow proper retraction and contact with the work,

respectively. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

- c. Blades of planers and jointers shall be fully guarded and have cylindrical heads with throats in the cylinder.
- d. Bandsaw blades shall be fully enclosed except at the point of operation.
- e. Additional guarding requirements for fixed (nonportable) woodworking machinery are contained in Appendix E.

13.C.02 Automatic feeding devices shall be installed on machines whenever possible. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points.

13.C.03 The operating speed shall be permanently marked on all circular saws more than 50 cm (20 in) in diameter or operating at over 51 peripheral m/s (10,000 peripheral ft/min).

- a. Any saw so marked shall not be operated at a speed other than that marked on the blade.
- b. When a marked saw is retensioned for a different speed, the marking shall be corrected to show the new speed.

13.C.04 Radial arm power saws shall be equipped with an automatic brake.

13.C.05 The table of radial arm or swing saws shall extend beyond the leading edge of the saw blade.

13.C.06 Radial arm power saws shall be installed in such a manner that the cutting head will return to the starting position when released by the operator. All swing cutoff and radial saws or similar machines which are drawn across a table shall be

equipped with limit stops to prevent the leading edge of the tool from traveling beyond the edge of the table.

13.C.07 Each hand-fed crosscut table saw and each hand-fed circular rip saw shall have a spreader to prevent the material from squeezing the saw or being thrown back on the operator.

13.C.08 Operating procedures.

- a. Bandsaws and other machinery requiring warmup for safe operation shall be permitted to warm up before being put into operation whenever the temperature is below 7° C (45° F).
- b. A push-stick, block, or other safe means shall be used on all operations close to high-speed cutting edges.
- c. The use of cracked, bent, or otherwise defective parts such as saw blades, cutters, or knives is prohibited.
- d. A brush shall be provided for the removal of sawdust, chips, and shavings on all woodworking machinery.
- e. Power saws shall not be left running unattended.

### 13.D PNEUMATIC TOOLS

13.D.01 Safety clips or retainers shall be installed and maintained on pneumatic impact tools to prevent dies and tools from being accidentally expelled from the barrel.

13.D.02 Pressure shall be shut off and exhausted from the line before disconnecting the line from any tool or connection.

13.D.03 Safety lashing shall be provided at connections between tool and hose and at all quick makeup type connections.

13.D.04 Hoses shall not be used for hoisting or lowering tools.

13.D.05 Airless spray guns of the type which atomize paints and fluids at high pressures (450 kg (1,000 lbs) or more) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released. In lieu of the above, a diffuser nut which will prevent high pressure velocity release while the nozzle tip is removed plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection may be provided.

13.D.06 Impact wrenches shall be provided with a locking device for retaining the socket.

13.D.07 See Section 20 for pressurized equipment and systems requirements.

### 13.E EXPLOSIVE-ACTUATED TOOLS

13.E.01 Explosive-actuated (powder-actuated) tools shall meet the design requirements of ANSI A10.3, Safety Requirements for Explosive-Actuated Tools.

13.E.02 Only qualified operators shall operate explosive-actuated tools. A qualified operator is one who has:

- a. been trained by an authorized instructor (one who has been trained, authorized, and provided an authorized instructor's card by the tool manufacturer or by an authorized representative of the tool manufacturer);
- b. passed a written examination provided by the manufacturer of the tool; and
- c. possesses a qualified operator's card supplied by the manufacturer and issued and signed by both the instructor and the operator.

13.E.03 Each tool shall be provided with the following:

- a. a lockable container with the words "**POWDER- ACTUATED**

**TOOL**" in plain sight on the outside and a notice reading **"WARNING - POWDER-ACTUATED TOOL TO BE USED ONLY BY A QUALIFIED OPERATOR AND KEPT UNDER LOCK AND KEY WHEN NOT IN USE"** on this inside;

- b. operator's instruction and service manual;
- c. power load and fastener charts;
- d. tool inspection record; and
- e. service tools and accessories.

#### 13.E.04 Inspection and testing.

- a. Daily inspection, cleaning, and testing shall be performed as recommended by the manufacturer.
- b. Explosive-actuated tools shall be tested, in accordance with the manufacturer's recommended procedure, each day before loading to see that safety devices are in proper working condition.
- c. Explosive-actuated tools shall be inspected, thoroughly cleaned and tested after each 1,000 fastenings.

13.E.05 Explosive-actuated tools and the charges shall be secured at all times to prevent unauthorized possession or use.

13.E.06 Explosive-actuated tools shall not be loaded until just before the intended firing time; neither loaded nor empty tools are to be pointed at any employees; hands shall be kept clear of the open barrel end.

13.E.07 The use of explosive-actuated tools is prohibited in explosive or flammable atmospheres.

13.E.08 Fasteners shall not be driven:

- a. into soft or easily penetrable materials unless they are backed by a material that will prevent the fastener from passing through to the other side;

- b. into very hard or brittle material, such as cast iron, hardened steel, glazed or hollow tile, glass block, brick, rock;
- c. into concrete unless the material thickness is at least three times the penetration of the fastener shank; or
- d. into spalled concrete.

13.E.09 The tool operator shall wear safety goggles or other face and eye protection.

### 13.F CHAIN SAWS

13.F.01 All chain saws shall have an automatic chain brake or kickback device.

13.F.02 The idle speed shall be adjusted so that the chain does not move when the engine is idling.

13.F.03 Operators will wear personal protective equipment: eye, ear, hand, foot (safety shoes), and leg protection are required as a minimum.

13.F.04 Chain saws will not be fueled while running or hot or near open flame; saws will not be started within 3 m (10 ft) of a fuel container.

13.F.05 The operator will hold the saw with both hands during all cutting operations.

13.F.06 A chain saw must never be used to cut above the operators' shoulder height.

13.F.07 See Section 31 for tree maintenance and removal requirements.

### 13.G ABRASIVE BLASTING EQUIPMENT

13.G.01 Hose and hose connections shall be designed to prevent build up of static electricity.

13.G.02 All connections and nozzles shall be designed to prevent accidental disengagement: all connections shall be equipped with safety lashings. > **See 20.A.16**

13.G.03 Nozzle attachments shall be of metal and fit on the outside of the hose. A deadman type control device shall be provided at the nozzle, to cut off the flow if the operator loses control of hose. A support shall be provided on which the nozzle may be mounted when it is not in use.

13.G.04 Additional requirements on abrasive blasting are in Sections 5 and 6.

#### DEFINITIONS

Abrasive wheel: a cutting tool made of abrasive grains held together by organic (such as resin, rubber, or shellac) or inorganic (such as clay, glass, porcelain, sodium silicate, magnesium oxychloride, or metal) bonds.

Explosive-actuated tool: a tool which uses the expanding gases from a power load to drive a fastener.

Mandrel: a steel shaft and bearings assembly on which a tool, such as an abrasive wheel, is mounted and by which power is transmitted from the machine to the tool.

Spindle: a long tapered pin or rod serving as an axis in spinning.

Tool rest (work rest): a device which prevents the tool or work piece from jamming between the abrasive wheel and the wheel guard.

## SECTION 14

### MATERIAL HANDLING, STORAGE, AND DISPOSAL

#### 14.A MATERIAL HANDLING

14.A.01 Employees shall be trained in and shall use safe lifting techniques.

14.A.02 Requirements for personal protective equipment are covered in Section 5.

14.A.03 Material handling devices shall be available for the material handling needs of an activity.

14.A.04 Whenever heavy or bulky material is to be moved, the material handling needs shall be evaluated in terms of weight, size, distance, and path of movement. The following hierarchy shall be followed in selecting a means for material handling:

- a. elimination of material handling needs by engineering,
- b. movement by mechanical device (e.g., lift truck, overhead crane, or conveyor),
- c. movement by manual means with handling aid (e.g., dollie or cart), or
- d. movement using safe lifting techniques.

14.A.05 Materials will not be moved over or suspended above personnel unless positive precautions have been taken to protect the personnel from falling objects.

14.A.06 Where the movement of materials may be hazardous to persons, taglines or other devices shall be used to control the loads being handled by hoisting equipment: these devices shall be nonconductive when used near energized lines.